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Effective Lagrangian approach to the EWSB sector

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In a model independent framework, the effects of new physics can be parametrized in terms of an effective Lagrangian at the electroweak scale. If the SU(2)L x U(1)Y gauge symmetry is linearly realized, these effects appear at lowest order as dimension−six operators, containing all the SM fields an the light scalar doublet. With a proper choice of the operator basis we perform a global fit to all the existing updated available data related to the EWSB sector: triple gauge boson vertex (TGV) measurements, electroweak precision tests and Higgs searches. In this framework modifications of the couplings of the Higgs field to the electroweak gauge bosons are related to anomalous TGVs. We show that the analysis of the latest Higgs boson data at the LHC and Tevatron gives rise to strong bounds on TGVs that are complementary to those from direct TGV analysis. We then present the tight constraints on TGVs obtained by combining all the available data on direct TGV studies and on Higgs production analysis. Interestingly, we show that this correlated pattern of deviations from Standard Model predictions and couplings can be different for theories of new physics based on a non-linear realization of the SU(2)L×U(1)Y symmetry. Furthermore, anomalous signals expected at first order in the non-linear realization may appear only at higher orders of the linear one, and viceversa. We analyze in detail the impact of both type of discriminating signals on LHC physics. They could lead to hints on the nature of the observed boson.

Summary

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